

**CPC****COOPERATIVE PATENT CLASSIFICATION****B23P****OTHER WORKING OF METAL; COMBINED OPERATIONS;  
UNIVERSAL MACHINE TOOLS** ([arrangements for copying or controlling B23Q](#))**NOTE**

This subclass does not cover non-mechanical operations on non-metallic materials unless such operations are specially mentioned in this subclass.

In this subclass, the following expressions are used with the meanings indicated:  
"combined operations" excludes the assembling of parts if it is an essential feature of the next metal-working operation, since it is not regarded as an operation per se.

"working of metal" and equivalent expressions include non-mechanical treatment of metal so far as it is not provided for in any other class or subclass, for example in C21D, C22C, C22F, C23. Thus, combinations of such non-mechanical treatment with other metal-working are classified in this subclass.

Attention is drawn to the Notes following the title of class B23.

**B23P 5/00**

**Setting gems or the like on metal parts, e.g. diamonds on tools**

**B23P 6/00**

**Restoring or reconditioning objects** ([straightening or restoring form of sheet metal, metal rods, metal tubes, metal profiles, or specific articles made therefrom B21D 1/00, B21D 3/00](#); [repairing defective or damaged objects by casting techniques B22D 19/10](#); [procedures or apparatus covered by a single other subclass, see the relevant subclass](#))

## B23P 6/002

- . { [Repairing turbine components, e.g. moving or stationary blades, rotors, \(B23P 6/045 takes precedence\)](#) }

## B23P 6/005

- . . { [using only replacement pieces of a particular form](#) }

## B23P 6/007

- . . { [using only additive methods, e.g. build-up welding](#) }

## B23P 6/02

- . Pistons or cylinders

## B23P 6/04

- . [Repairing fractures or cracked metal parts or products, e.g. castings](#)

## B23P 6/045

- . . { [of turbine components, e.g. moving or stationary blades, rotors, etc.](#) }

**B23P 9/00**

**Treating or finishing surfaces mechanically, with or without calibrating, primarily to resist wear or impact, e.g. smoothing or roughening turbine blades or bearings** ([treatment covered by a single other subclass, see the relevant subclass, e.g. B24C, C21D 7/00, C22F 1/00](#)); **Features of such surfaces not otherwise provided for, their treatment being unspecified**

## B23P 9/02

- . [Treating or finishing by applying pressure, e.g. knurling \(B23P 9/04 takes precedence\)](#)

- B23P 9/025 . . { to inner walls of holes by using axially moving tools}
- B23P 9/04 . Treating or finishing by hammering or applying repeated pressure
- B23P 11/00** **Connecting metal parts or objects by metal-working techniques, not covered wholly by either [B21J](#) or [B23K](#)(connecting sheet metal or metal tubes, rods, or profiles [B21D 39/00](#); {objects produced by methods not important per se, see the relevant subclasses dealing with the objects, e.g. [B21F 15/00](#); [B21L 19/00](#)}; hand tools for connecting wire or strip [B25B 25/00](#); connecting metal parts by adhesives [F16B 11/00](#))**
- B23P 11/005 . {by expanding or crimping}
- B23P 11/02 . by first expanding and then shrinking or *vice versa*, e.g. by using pressure fluids; by making force fits
- B23P 11/022 . . {by using pressure fluids}
- B23P 11/025 . . {by using heat or cold}
- B23P 11/027 . . . { for mounting tools in tool holders}
- B23P 13/00** **Making metal objects by operations essentially involving machining but not covered by a single other subclass (making specific objects [B23P 15/00](#))**
- B23P 13/02 . in which only the machining operations are important
- B23P 13/04 . involving slicing of profiled material
- B23P 15/00** **Making specific metal objects by operations not covered by a single other subclass or a group in this subclass**
- B23P 15/001 . {valves or valve housings (welding [B23K](#); valve housings per se [F16K](#))}
- B23P 15/002 . . {poppet valves}
- B23P 15/003 . {bearings (see also [F16C 33/00](#))}
- B23P 15/005 . {keys (making keys without essentially removing material, e.g. by punching [B21D 53/42](#); milling grooves in keys [B23C 3/35](#))}
- B23P 15/006 . {turbine wheels}
- B23P 15/007 . {injection moulding tools}
- B23P 15/008 . { Rocket engine parts, e.g. nozzles, combustion chambers}
- B23P 15/02 . turbine or like blades from one piece
- B23P 15/04 . turbine or like blades from several pieces
- B23P 15/06 . piston rings from one piece
- B23P 15/065 . . {from metal strip}

- B23P 15/08 . piston rings from several pieces
- B23P 15/10 . pistons
- B23P 15/105 .. {Enlarging pistons}
- B23P 15/12 . gratings {(making gratings by methods covered by other subclasses [B21D 47/005](#))}
- B23P 15/14 . gear parts, e.g. gear wheels
- B23P 15/16 . plates with holes of very small diameter, e.g. for spinning or burner nozzles
- B23P 15/18 . brake shoes
- B23P 15/20 . railroad requirements, e.g. buffers
- B23P 15/22 . cartridges or like shells
- B23P 15/24 . dies ([B21C 3/18](#), [B21C 25/10](#), [B21D 37/20](#) take precedence)
- B23P 15/243 .. {Honeycomb dies}
- B23P 15/246 .. {Laminated dies}
- B23P 15/26 . heat exchangers {or the like (making heat exchangers by methods covered by other subclasses [B21D 53/02](#))}
- B23P 15/28 . cutting tools (sawing tools [B23D 63/00](#), [B23D 65/00](#); files or rasps [B23D 73/00](#))
- B23P 15/30 .. lathe or like tools
- B23P 15/32 .. twist-drills
- B23P 15/34 .. milling cutters
- B23P 15/36 ... for thread-cutting
- B23P 15/38 .. planing or slotting tools ([B23P 15/30](#) takes precedence)
- B23P 15/40 .. shearing tools
- B23P 15/403 ... {razor blades}
- B23P 15/406 ... {rotary or plane die cutters}
- B23P 15/42 .. broaching tools
- B23P 15/44 .. scraping or shaving tools
- B23P 15/46 .. reaming tools
- B23P 15/48 .. threading tools (milling cutters for thread-cutting [B23P 15/36](#))
- B23P 15/50 ... dies
- B23P 15/52 ... taps
- B23P 17/00 Metal-working operations, not covered by a single other subclass or another group in this subclass**
- B23P 17/02 . Single metal-working processes; Machines or apparatus therefor
- B23P 17/04 . characterised by the nature of the material involved or the kind of product

- independently of its shape
- B23P 17/06 .. Making steel wool or the like
- B23P 19/00** **Machines for simply fitting together or separating metal parts, or metal and non-metal parts, whether or not involving some deformation (connecting metal parts or objects by metal-working procedures [B23P 11/00](#), [B21J](#), [B23K](#)); Tools or devices therefor so far as not provided for in other classes (hand tools in general [B25](#))**
- B23P 19/001 . {Article feeders for assembling machines (screws or nuts being carried by a disposable strip or disc [B25B 23/045](#))}
- B23P 19/002 .. {orientating the articles}
- B23P 19/003 .. {Escapement mechanisms used therewith}
- B23P 19/004 .. {Feeding the articles from hoppers to machines or dispensers}
- B23P 19/005 ... {by using flowing gases}
- B23P 19/006 .. {Holding or positioning the article in front of the applying tool}
- B23P 19/007 .. {Picking-up and placing mechanisms}
- B23P 19/008 . {the parts being continuously transported through the machine during assembling or disassembling}
- B23P 19/02 . for connecting objects by press fit or for detaching same
- B23P 19/021 .. { Railroad wheels on axles}
- B23P 19/022 .. {Extracting or inserting relatively long parts}
- B23P 19/024 ... {tube bundles}
- B23P 19/025 .. { For detaching only}
- B23P 19/027 .. using hydraulic or pneumatic means ([B23P 19/033](#) takes precedence)
- B23P 19/033 .. using vibration
- B23P 19/04 . for assembling or disassembling parts
- B23P 19/041 .. {for disassembling pallets}
- B23P 19/042 .. {specially adapted for combustion engines (shape of casings adapted to facilitate fitting or dismantling of engine parts for combustion engines [F02F 7/0046](#))}
- B23P 19/043 ... { for inserting piston-connecting rods assemblies in cylinders}
- B23P 19/045 ... { for assembling valve cotters and retainers of engine valves}
- B23P 19/046 .. {Disassembling lids from drums, e.g. by unfolding, for reconditioning or recovery}
- B23P 19/047 .. {for flexible profiles, e.g. sealing or decorating strips in grooves or on other profiles by devices moving along the flexible profile (hand tools therefor [B25B 27/0092](#))}
- B23P 19/048 .. {Springs}
- B23P 19/06 .. Screw or nut setting or loosening machines
- B23P 19/061 ... {for pipes or pipe-couplings}
- B23P 19/062 ... {Pierce nut setting machines}
- B23P 19/063 .... { Deforming the nut only}
- B23P 19/064 .... { Deforming the support material only, e.g. the sheet or plate}
- B23P 19/065 ... {Arrangements for torque limiters or torque indicators in screw or nut setting machines (for hand tools [B25B 23/14](#))}

- B23P 19/066 . . . . {by electrical means}
- B23P 19/067 . . . {Bolt tensioners (for hand tools [B25B 29/02](#))}
- B23P 19/068 . . . . { by using heating means}
- B23P 19/069 . . . {Multi-spindle machines}
- B23P 19/08 . . Machines for placing washers, circlips, or the like on bolts or other members
- B23P 19/082 . . . {for placing washers on nuts}
- B23P 19/084 . . . {for placing resilient or flexible rings, e.g. O-rings, circlips}
- B23P 19/086 . . . . { Non-metallic protective bellows}
- B23P 19/088 . . . . { Piston rings in piston grooves}
  
- B23P 19/10 . . Aligning parts to be fitted together
- B23P 19/102 . . { using remote centre compliance devices}
- B23P 19/105 . . . { using sensing means}
- B23P 19/107 . . { using oscillating, rotating or vibrating movements}
- B23P 19/12 . . Alignment of parts for insertion into bores
  
- B23P 21/00** **Machines for assembling a multiplicity of different parts to compose units, with or without preceding or subsequent working of such parts, e.g. with programme control**
  
- B23P 21/002 . . {the units stationary whilst being composed}
- B23P 21/004 . . {the units passing two or more work-stations whilst being composed}
- B23P 21/006 . . . {the conveying means comprising a rotating table}
  
- B23P 21/008 . . { the assembling machines or tools moving synchronously with the units while these are being assembled}
  
- B23P 23/00** **Machines or arrangements of machines for performing specified combinations of different metal-working operations not covered by a single other subclass (if the particular kinds of operation are not essential [B23Q 37/00](#) to [B23Q 41/00](#); { working by laser beam combined with other working of metal [B23K 26/0093](#)})**
  
- B23P 23/02 . . Machine tools for performing different machining operations (lathes, e.g. capstan lathes, [B23B](#); combined horizontal boring and milling machines [B23B 39/02](#))
- B23P 23/04 . . for both machining and other metal-working operations
- B23P 23/06 . . Metal-working plant comprising a number of associated machines or apparatus
  
- B23P 25/00** **Auxiliary treatment of workpieces, before or during machining operations, to facilitate the action of the tool or the attainment of a desired final condition of the work, e.g. relief of internal stress**
  
- B23P 25/003 . . {immediately preceeding a cutting tool}
- B23P 25/006 . . . { Heating the workpiece by laser during machining}

<b>B23P 2700/00</b>	<b>Indexing scheme relating to the articles being treated, e.g. manufactured, repaired, assembled, connected or other operations covered in the subgroups</b>
B23P 2700/01	. Aircraft parts
B23P 2700/02	. Camshafts
B23P 2700/03	. Catalysts or parts thereof
B23P 2700/04	. Connecting rods
B23P 2700/05	. Cooking vessels
B23P 2700/06	. Cooling passages of turbine components, e.g. unblocking or preventing blocking of cooling passages of turbine components
B23P 2700/07	. Crankshafts
B23P 2700/08	. Fittings for doors and windows of buildings
B23P 2700/09	. Heat pipes
B23P 2700/10	. Heat sinks
B23P 2700/11	. Joints, e.g. ball joints, universal joints
B23P 2700/12	. Laminated parts
B23P 2700/13	. Parts of turbine combustion chambers
B23P 2700/14	. Suspension elements of automobile vehicles
B23P 2700/50	. Other automobile vehicle parts, i.e. manufactured in assembly lines